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1 Probabilistic inductive inference
L. Pitt
April 1989 **Journal of the ACM (JACM)**, Volume 36 Issue 2
Publisher: ACM Press
Full text available: pdf(4.04 MB) Additional Information: full citation, abstract, references, citings, index terms, review

Inductive inference machines construct programs for total recursive functions given only example values of the functions. Probabilistic inductive inference machines are defined, and for various criteria of successful inference, it is asked whether a probabilistic inductive inference machine can infer larger classes of functions if the inference criterion is relaxed to allow inference with probability at least p, $(0 < p < 1)$ as opposed ...

2 Probabilistic diagnosis of multiprocessor systems
Sunggu Lee, Kang Geun Shin
March 1994 **ACM Computing Surveys (CSUR)**, Volume 26 Issue 1
Publisher: ACM Press
Full text available: pdf(1.81 MB) Additional Information: full citation, abstract, references, citings, index terms, review

This paper critically surveys methods for the automated probabilistic diagnosis of large multiprocessor systems. In recent years, much of the work on system-level diagnosis has focused on probabilistic methods, which can diagnose intermittently faulty processing nodes and can be applied in general situations on general interconnection networks. The theory behind the probabilistic diagnosis methods is explained, and the various diagnosis algorithms are descr ...

Keywords: centralized and distributed self-diagnosis, comparison testing, fault-tolerant computing, probabilistic diagnosis, system-level diagnosis, system-level testing

3 New directions in timing analysis: From blind certainty to informed uncertainty
Kurt Keutzer, Michael Orshansky
December 2002 **Proceedings of the 8th ACM/IEEE international workshop on Timing issues in the specification and synthesis of digital systems**
Publisher: ACM Press
Full text available: pdf(243.42 KB) Additional Information: full citation, abstract, references, citings, index terms

The accuracy, computational efficiency, and reliability of static timing analysis have made it the workhorse for verifying the timing of synchronous digital integrated circuits for more than a decade. In this paper we charge that the traditional deterministic approach to analyzing the timing of circuits is significantly undermining its accuracy and may even challenge its reliability. We argue that computation of the static timing of a circuit requires a dramatic rethinking in order to continue s ...

4 On contention resolution protocols and associated probabilistic phenomena

P. D. MacKenzie, C. G. Plaxton, R. Rajaraman
March 1998 **Journal of the ACM (JACM)**, Volume 45 Issue 2
Publisher: ACM Press

Full text available: pdf(389.75 KB) Additional Information: full citation, abstract, references, citings, index terms, review

Consider an on-line scheduling problem in which a set of abstract processes are competing for the use of a number of resources. Further assume that it is either prohibitively expensive or impossible for any two of the processes to directly communicate with one another. If several processes simultaneously attempt to allocate a particular resource (as may be expected to occur, since the processes cannot easily coordinate their allocations), then none succeed. In such a framework, it is a chal ...

Keywords: emulation protocols, hash functions, parallel computation

5 Discovering models of software processes from event-based data

Jonathan E. Cook, Alexander L. Wolf
July 1998 **ACM Transactions on Software Engineering and Methodology (TOSEM)**, Volume 7 Issue 3
Publisher: ACM Press

Full text available: pdf(369.76 KB) Additional Information: full citation, abstract, references, citings, index terms, review

Many software process methods and tools presuppose the existence of a formal model of a process. Unfortunately, developing a formal model for an on-going, complex process can be difficult, costly, and error prone. This presents a practical barrier to the adoption of process technologies, which would be lowered by automated assistance in creating formal models. To this end, we have developed a data analysis technique that we term process discovery. Under this technique, data ...

Keywords: Balboa, process discovery, software process, tools

6 Memory testing and test set improvement: Test set enrichment using a probabilistic fault model and the theory of output deviations

Zhanglei Wang, Krishnendu Chakrabarty, Michael Goessel
March 2006 **Proceedings of the conference on Design, automation and test in Europe: Proceedings DATE '06**
Publisher: European Design and Automation Association
Full text available: pdf(276.96 KB) Additional Information: full citation, abstract, references

We present a probabilistic fault model that allows any number of gates in an integrated circuit to fail probabilistically. Tests for this fault model, determined using the theory of output deviations, can be used to supplement tests for classical fault models, thereby increasing test quality and reducing the probability of test escape. Output deviations can also be used for test selection, whereby the most effective test patterns can be selected from large test sets during time-constrained and h ...

7 Probabilistic state machines: dialog management for inputs with uncertainty

Scott E. Hudson, Gary L. Newell
December 1992 **Proceedings of the 5th annual ACM symposium on User interface software and technology**
Publisher: ACM Press

Full text available: pdf(973.32 KB) Additional Information: full citation, abstract, references, citings, index terms

Traditional models of input work on the assumption that inputs delivered to a system are fairly certain to have occurred as they are reported. However, a number of new input modalities, such as pen-based inputs, hand and body gesture inputs, and voice input, do not share this property. Inputs under these techniques are normally acquired by a process of recognition. As a result, each of these techniques makes mistakes and provides inputs which are approximate or uncertain. This paper conside ...

8 Capabilities of probabilistic learners with bounded mind changes

Robert Daley, Bala Kalyanasundaram
August 1993 **Proceedings of the sixth annual conference on Computational learning theory**
Publisher: ACM Press
Full text available: pdf(912.28 KB) Additional Information: full citation, references, citings, index terms

9 A simple parallel algorithm for the maximal independent set problem

M Luby
December 1985 **Proceedings of the seventeenth annual ACM symposium on Theory of computing**
Publisher: ACM Press

Full text available: pdf(832.98 KB) Additional Information: full citation, abstract, references, citings, index terms

Simple parallel algorithms for the maximal independent set (MIS) problem are presented. The first algorithm is a Monte Carlo algorithm with a very local property. The local property of this algorithm may make it a useful protocol design tool in distributed computing environments and artificial intelligence. One of the main contributions of this paper is the development of powerful and general techniques for converting Monte Carlo algorithms into deterministic algorithms. These techniques ar ...

10 Probabilistic fault localization in communication systems using belief networks

Małgorzata Steinder, Adarshpal S. Sethi
October 2004 **IEEE/ACM Transactions on Networking (TON)**, Volume 12 Issue 5
Publisher: IEEE Press
Full text available: pdf(630.83 KB) Additional Information: full citation, abstract, references, index terms

We apply Bayesian reasoning techniques to perform fault localization in complex communication systems while using dynamic, ambiguous, uncertain, or incorrect information about the system structure and state. We introduce adaptations of two Bayesian reasoning techniques for polytrees, iterative belief updating, and iterative most probable explanation. We show that these approximate schemes can be applied to belief networks of arbitrary shape and overcome the inherent exponential complexity ass ...

Keywords: fault localization, probabilistic inference, root cause diagnosis

11 Analysis techniques: A probabilistic analysis for the range assignment problem in ad hoc networks

Paolo Santi, Douglas M. Blough, Feodor Vainstein
October 2001 **Proceedings of the 2nd ACM international symposium on Mobile ad hoc networking & computing**
Publisher: ACM Press

Full text available: pdf(200.83 KB) Additional Information: full citation, abstract, references, citings, index terms

In this paper we consider the following problem for ad hoc networks: assume that n nodes are distributed in a d-dimensional region, with $1 \leqslant d \leqslant 3$, and assume that all the nodes have the same transmitting range r; how large must r be to ensure that the resulting network is strongly connected? We study this problem by means of a probabilistic approach, and we establish lower and upper bounds on the probability of connectedness. For the one-dimensional case, th ...

12 Automating process discovery through event-data analysis
Jonathan E. Cook, Alexander L. Wolf
April 1995 **Proceedings of the 17th international conference on Software engineering**
Publisher: ACM Press
Full text available: pdf(1.04 MB) Additional Information: full citation, references, citings, index terms

13 Special issue on using large corpora: II: Coping with ambiguity and unknown words through probabilistic models
Ralph Weischedel, Richard Schwartz, Jeff Palmucci, Marie Meteer, Lance Ramshaw
June 1993 **Computational Linguistics**, Volume 19 Issue 2
Publisher: MIT Press
Full text available: pdf(1.59 MB) Publisher Site Additional Information: full citation, abstract, references, citings

From spring 1990 through fall 1991, we performed a battery of small experiments to test the effectiveness of supplementing knowledge-based techniques with probabilistic models. This paper reports our experiments in predicting parts of speech of highly ambiguous words, predicting the intended interpretation of an utterance when more than one interpretation satisfies all known syntactic and semantic constraints, and learning caseframe informationfor verbsfrom example uses.From these experiments, w ...

14 Cryptographic limitations on learning Boolean formulae and finite automata
Michael Kearns, Leslie Valiant
January 1994 **Journal of the ACM (JACM)**, Volume 41 Issue 1
Publisher: ACM Press

Full text available: pdf(2.26 MB) Additional Information: full citation, abstract, references, citings, index terms

In this paper, we prove the intractability of learning several classes of Boolean functions in the distribution-free model (also called the Probably Approximately Correct or PAC model) of learning from examples. These results are representation independent, in that they hold regardless of the syntactic form in which the learner chooses to represent its hypotheses. Our methods reduce the problems of cracking a number of well-known public-key cryptosystems to the l ...

15 On Statistical Timing Analysis with Inter- and Intra-Die Variations
Hratch Mangassarian, Mohab Anis
March 2005 **Proceedings of the conference on Design, Automation and Test in Europe - Volume 1 DATE '05**
Publisher: IEEE Computer Society

Full text available: pdf(463.21 KB) Additional Information: full citation, abstract, index terms

In this paper, we highlight a fast, effective and practical statistical approach that deals with inter and intra-die variations in VLSI chips. Our methodology is applied to a number of random variables while accounting for spatial correlations. Our methodology sorts the Probability Density Functions (PDFs) of the critical paths of a circuit based on a confidence-point. We show the mathematical accuracy of our method as well as implement a typical program to test it on various benchmarks. We find ...

16 Multimodal applications: Multimodal detection of human interaction events in a nursing home environment

Datong Chen, Robert Malkin, Jie Yang

October 2004 **Proceedings of the 6th international conference on Multimodal interfaces**

Publisher: ACM Press

Full text available: pdf(307.78 KB) Additional Information: full citation, abstract, references, index terms

In this paper, we propose a multimodal system for detecting human activity and interaction patterns in a nursing home. Activities of groups of people are firstly treated as interaction patterns between any pair of partners and are then further broken into individual activities and behavior events using a multi-level context hierarchy graph. The graph is implemented using a dynamic Bayesian network to statistically model the multi-level concepts. We have developed a coarse-to-fine prototype sy ...

Keywords: group activity, human interaction, medical care, multimodal, stochastic modeling

17 Statistical and yield analysis: A probabilistic analysis of pipelined global interconnect under process variations

Navneeth Kankani, Vineet Agarwal, Janet Wang

January 2006 **Proceedings of the 2006 conference on Asia South Pacific design automation ASP-DAC '06**

Publisher: ACM Press

Full text available: pdf(241.28 KB) Additional Information: full citation, abstract, references

The main thesis of this paper is to perform a reliability based performance analysis for a shared latch inserted global interconnect under uncertainty. We first put forward a novel delay metric named DMA for estimation of interconnect delay probability density function considering process variations. Without considerable loss in accuracy, DMA can achieve high computational efficiency even in a large space of random variables. We then propose a comprehensive probabilistic methodology for sampling ...

18 Sensor deployment and target localization in distributed sensor networks

Yi Zou, Krishnendu Chakrabarty

February 2004 **ACM Transactions on Embedded Computing Systems (TECS)**, Volume 3 Issue 1

Publisher: ACM Press

Full text available: pdf(294.46 KB) Additional Information: full citation, abstract, references, index terms, review

The effectiveness of cluster-based distributed sensor networks depends to a large extent on the coverage provided by the sensor deployment. We propose a virtual force algorithm (VFA) as a sensor deployment strategy to enhance the coverage after an initial random placement of sensors. For a given number of sensors, the VFA algorithm attempts to maximize the sensor field coverage. A judicious combination of attractive and repulsive forces is used to determine the new sensor locations that improve ...

Keywords: Cluster-based sensor networks, cluster head, sensor field coverage, sensor placement, virtual force

19 Tight lower bounds for probabilistic solitude verification on anonymous rings

Karl Abrahamson, Andrew Adler, Lisa Highám, David Kirkpatrick
March 1994 **Journal of the ACM (JACM)**, Volume 41 Issue 2
Publisher: ACM Press

Full text available: pdf(2.33 MB) Additional Information: full citation, abstract, references, citings, index terms

A model that captures communication on asynchronous unidirectional rings is formalized. Our model incorporates both probabilistic and nondeterministic features and is strictly more powerful than a purely probabilistic model. Using this model, a collection of tools are developed that facilitate studying lower bounds on the expected communication complexity of Monte Carlo algorithms for language recognition problems on anonymous asynchronous unidirectional rings. The tools are used to establi ...

Keywords: Leader Election, Solitude Verification, anonymous ring, asynchronous unidirectional ring, bit complexity, lower bounds, nondeterminism

20 A framework for rare event simulation of stochastic Petri nets using "RESTART"

Christian Kelling
November 1996 **Proceedings of the 28th conference on Winter simulation**
Publisher: ACM Press
Full text available: pdf(777.19 KB) Additional Information: full citation, references

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